outer portion of the CVD-SiC layer that is impurity-enriched such that the outer surface portion has the claimed surface impurity level.

The PTO continues to rely upon Thilderkvist et al. for alleged disclosure of most of the features of the claimed invention, and on the secondary reference to Kumar et al. for disclosure of CVD-SiC layer. However, the references do not even remotely suggest impurity reduction at the outer surface of the outer surface portion to the extent claimed, and further, do not even remotely *enable* such profound impurity reduction at the outer surface. More specifically, the prior art teaches a process in which impurity reduction is carried out by coating an SiC semiconductor processing component with a sacrificial layer that includes silicon. During coating contaminants on or in the surface of the component are collected by the silicon-containing layer. That layer is then removed along with collected contaminants. See the paragraph bridging columns 3 and 4 of Thilderkvist et al. Applicants have discovered that such use of sacrificial layers to collect or "getter" contaminants from an outer surface of an SiC component are of limited effectiveness. Provided below is actual data collected by the present inventors illustrating the degree to which such sacrificial or gettering layers are effective.

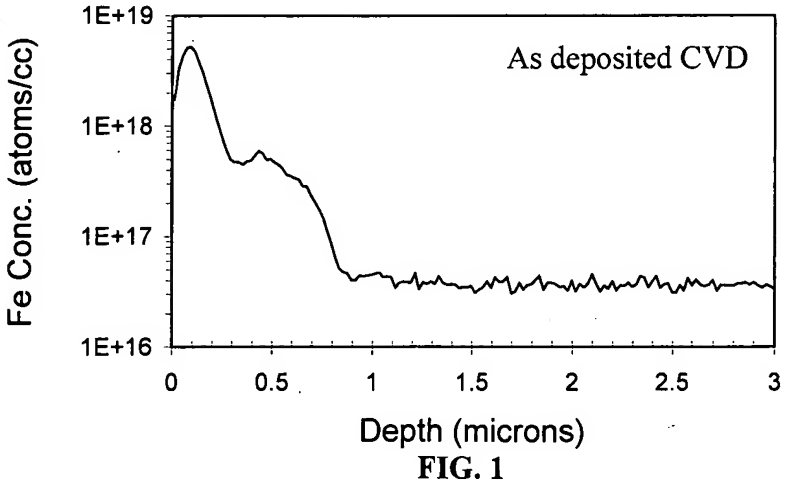

FIG. 1

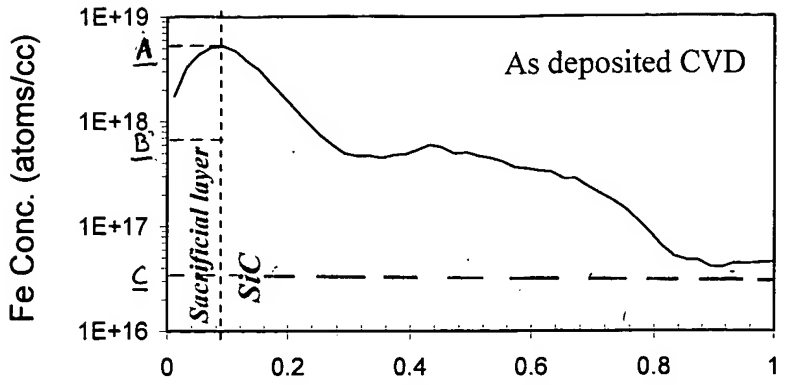

FIG. 2

FIGs. 1 and 2 illustrate impurity concentration (Fe concentration) in atoms/cc as a function of depth of the CVD-SiC layer. As is generally shown Fig. 1, the outer surface portion in the first micron of depth has a notably elevated iron concentration, stabilizing at a background level or bulk impurity level at a depth below 1 micron. The semiconductor processing component carrying the CVD-SiC coating was processed to form a 1500 A silicon-containing sacrificial layer in order to getter or collect contaminants from the CVD-SiC layer, shown in Fig 2. The sacrificial layer is a silicon oxide, and the component was then subjected to high temperature annealing for twelve hours in an atmosphere containing Ar and H_2. Heat treatment was continued for twelve hours in order to drive contaminants into the sacrificial layer, which can then be removed. Three notable impurity levels were measured, original surface impurity level A at the SiC surface, post-treatment surface impurity level B at the SiC surface, and bulk impurity level C at a depth of 3 microns. The values are plotted on Fig. 2 from the measurements.

While it was shown that the sacrificial layer was effective to reduce impurity levels a full order of magnitude from 5E18 atoms/cc (original surface impurity level A at the SiC surface) to 7E17 atoms/cc (post-treatment surface impurity level B at the SiC surface), it is quite clear that the thus purified outer surface portion still is quite dirty, having an impurity level of 20X the bulk impurity level of 3.5E16. In contrast, the claimed invention specifically calls for a surface impurity level not greater than 2X the bulk impurity level. The use of a sacrificial layer enabled only moderate reduction in

impurity level not even remotely close to 2X that of the bulk impurity level (about 7E16 atoms/cc).

The reason for the limited effectiveness of use of a sacrificial gettering layer is actually quite clear to Applicants. As is shown, the concentration of impurities extends to a depth of about 1 micron. Due to the low diffusion coefficient of impurities in SiC, the ability to purify through use of a sacrificial gettering layer is limited to about 250 nm. Accordingly, the use of a sacrifical gettering layer cannot effectively clean the outer surface portion to an impurity level as claimed.

Applicants have unequivocally demonstrated that the approach taken by the prior art, which focuses on use of a silicon-containing sacrifical gettering layer, cannot enable impurity reduction to a level on the order of the claimed invention. Accordingly, it is quite clear that Thilderkvist et al. and Kumar et al. do not even remotely meet all features of the claimed invention. Accordingly, withdrawal of the §103 rejection over those references is respectfully requested.

As to the remaining rejections contained in the Office Action, the PTO's reliance upon additional secondary references fails to cure the deficiencies of Thilderkvist et al. and Kumar et al. discussed in detail above.

Applicants respectfully submit that the present application is now in condition for allowance. Accordingly, the Examiner is requested to issue a Notice of Allowance for all pending claims. The Commissioner is hereby authorized to charge any fees that may be required, or credit any overpayment, to Deposit Account Number 50-3797.

Respectfully submitted,

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Date

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